

CLAIMS

5 1. A coating composition, said composition comprising:

 (1) a polyamide-amic acid (PAA), said PAA comprising amide-amic acid
units each comprising a carboxyl group;

 (2) a neutralizing agent capable of neutralizing a carboxyl group;

 (3) a directly linkable molecule, said molecule being one that is linkable to a
10 carboxyl group; and

 (4) water.

 2. A coating composition of Claim 1 wherein the directly linkable molecule is a
cross-linker, such that one molecule of the directly linkable molecule can form covalent
15 links to two other molecules and both such links can exist at the same time.

 3. A coating composition of Claims 1 or 2 wherein the directly linkable molecule is a
PAA.

20 4. A coating composition of Claims 1 or 2 wherein the directly linkable molecule is
selected from the group consisting of a functionalized siloxane, a functionalized
polysiloxane, an amine, a polyamine-imine, an oxazoline, a polyoxazoline, and a
functionalized polyurethane.

5. A coating composition of Claims 1 or 2 wherein the directly linkable molecule comprises a moiety selected from the group consisting of an epoxy, amino, hydroxyl, isocyanate, oxazoline, and a carboxyl moiety.

5 6. A composition of Claims 1 or 2 wherein said neutralizing agent is selected from the group consisting of secondary amines, tertiary amines, ammonia, a metal base, a metal carbonate, and a quaternary molecule.

 7. A composition of Claims 1 or 2 wherein said neutralizing agent reversibly
10 neutralizes the carboxyl groups on the PAA molecule.

 8. A coating composition of Claims 1 or 2 wherein said composition further comprises an agent selected from the group consisting of a swelling agent, a wetting agent, a coalescing agent, a priming agent and an antifoaming agent.

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 9. A coating composition of Claims 1 or 2 wherein said composition further comprises an a swelling agent, a coalescing agent, and a priming agent.

 10. A coating composition of Claims 1 or 2 wherein said composition further
20 comprises a swelling agent, a wetting agent, a coalescing agent, a priming agent and an antifoaming agent.

 11. A coating composition of Claims 1 or 2 wherein said composition further

comprises an agent that reduces the surface energy of a coating.

12. A coating composition of claims 1 or 2 wherein said composition further comprises a compound comprising fluorine.

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13. A coating composition of Claims 1 or 2 wherein said composition further comprises PTFE.

14. A coating composition of Claim 2, wherein one of the two other molecules is
10 another molecule of the cross-linker.

15. A coating composition of Claim 2, wherein the composition further comprises a cross-linkable molecule, said cross-linkable molecule linkable to the cross-linker.

15 16. A coating composition of Claim 15, wherein the cross-linkable molecule is selected from the group consisting of a functionalized siloxane, a functionalized polysiloxane, an amine, a polyamine-imine, an oxazoline, a polyoxazoline, and a functionalized polyurethane.

20 17. A coating composition of Claim 15 wherein the cross-linkable molecule comprises a moiety selected from the group consisting of an epoxy, amino, hydroxyl, isocyanate, oxazoline, and a carboxyl moiety.

18. A coating comprising a PAI linked at least to one molecule other than a PAA or a PAI.

5 19. A coating of Claim 18 wherein said at least one molecule other than a PAA is selected from the group consisting of functionalized siloxane, a functionalized polysiloxane, an amine, a polyamine-imine, an oxazoline, a polyoxazoline, and a functionalized polyurethane.

10 20. A coating of Claim 18 wherein said at least one molecule other than a PAA comprises a moiety selected from the group consisting of an epoxy, amino, hydroxyl, isocyanate, oxazoline, and a carboxyl moiety

15 21. A coating of Claims 18, 19 or 20 wherein said composition further comprises an agent that reduces the surface energy of the coating.

22. A coating of Claims 18, 19 or 20 wherein said composition further comprises a compound comprising fluorine.

20 23. A coating of Claims 18, 19 or 20 wherein said composition further comprises a PTFE.

24. A coating prepared from a coating composition of Claims 1 or 2.

25. An article of manufacture comprising a coating of Claims 18, 19 or 20.

26. An article of manufacture comprising a coating of Claims 18, 19 or 20, said
5 article being an industrial fabric.

27. An article of manufacture comprising a coating of Claims 18, 19 or 20, wherein
said article of manufacture fabric is a papermaking machine fabric.

10 28. An article of manufacture comprising a coating of Claims 18, 19 or 20, wherein
said article of manufacture fabric is a through-air-dryer fabric.

29. An article of manufacture comprising a coating of Claims 18, 19 or 20, wherein
said article of manufacture fabric is a dryer fabric.

15 30. An article of manufacture comprising a coating of Claims 18, 19 or 20, wherein
said article of manufacture fabric is a press fabric.

31. An article of manufacture comprising a coating of Claims 18, 19 or 20, wherein
20 said article of manufacture fabric is a press fabric, wherein the press fabric comprises nylon.

32. An article of manufacture comprising a coating of Claims 18, 19 or 20, wherein
said article of manufacture fabric is a forming fabric.

33. A process of coating an article of manufacture, said process comprising the use of a composition of Claim 1.

5 34. A process of Claim 33 comprising the steps of

(1) coating the article with the composition;

(2) removing the water from the composition;

(3) increasing the temperature so as to volatilize the neutralizing agent;

(4) maintaining or increasing the temperature for step (3) until the PAA links to the

10 directly linkable molecule; and

(5) maintaining or increasing the temperature for step (4) until at least some of the remaining amide-amic acid units in the PAA convert to amide-imide units.

35 A process of Claim 34 wherein in step (5) or a subsequent step all the remaining

15 amide-amic acid units in the PAA are converted to amide-imide units.

36. A process of coating an article of manufacture, said process comprising the use of a composition of Claim 2.

20 37. A process of Claim 36 comprising the steps of

(1) coating the article with the composition;

(2) removing the water from the composition;

(3) increasing the temperature so as to volatilize the neutralizing agent;

(4) maintaining or increasing the temperature for step (3) until the PAA links to the crosslinker and the crosslinker links to the crosslinkable molecule; and

(5) maintaining or increasing the temperature for step (4) until any remaining amide-amic acid units in the PAA convert to amide-imide units.

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38. A process of Claim 37 wherein in step (5) or a subsequent step all the remaining amide-amic acid units in the PAA are converted to amide-imide units.

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39. A process of Claims 33, 34, 36 or 37 wherein the article of manufacture is an industrial fabric.

40. A process of Claims 33, 34, 36 or 37 wherein the article of manufacture is a papermaking machine fabric.

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41. A process of Claims 33, 34, 36 or 37 wherein the article of manufacture is a through-air dryer fabric.

42. A process of Claims 33, 34, 36 or 37 wherein the article of manufacture is a dryer fabric.

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43. A process of Claims 33, 34, 36 or 37 wherein the article of manufacture is a press fabric.

44. A process of Claims 33, 34, 36 or 37 wherein the article of manufacture is a forming fabric.

5 45. A process of making paper, said process comprising the use of a papermaking machine fabric, wherein said fabric was coated by a process comprising the composition of Claims 1 or 2.

10 46. A process of making paper, said process comprising the use of a papermaking machine fabric, wherein said fabric was coated by a process comprising the composition of Claims 1 or 2, and wherein said fabric is a through-air-dryer-fabric.

 47. A process of making paper, said process comprising the use of a papermaking machine fabric, wherein said fabric comprises a coating of Claims, 18, 19, or 20.

15 48. A process of making paper, said process comprising the use of a through-air-dryer machine fabric, wherein said fabric comprises a coating of Claims, 18, 19, or 20.

 49. A process of making paper, said process comprising the use of a through-air dryer machine fabric, said fabric comprising a coating, said coating comprising a polymer.